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Field Dependent Magnetisation Studies on a Single Crystal of the Spin-Ice Pyrochlore $\text{Ho}_2\text{Ti}_2\text{O}_7$

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Field and temperature dependent magnetisation results on crystals of the spin-ice pyrochlore, $\text{Ho}_2\text{Ti}_2\text{O}_7$ are reported. Curie-Weiss analysis of the high temperature data reveals predominant ferromagnetic interactions between the moments. Low temperature magnetization isotherms are shown to be similar to that predicted by the nearest neighbor spin-ice model. Calculations of the field dependent magnetisation of a spin ice tetrahedron will be used to qualitatively explain the data. Below the lock-in temperature, $T^* \simeq 1.97$ K, the data is consistent with the moments lying in a specific two-spin-in, two-spin-out arrangement along the $[1\ 1\ 1]$ direction.